

REMARKS

This paper is in response to the Official Action mailed September 28, 2006.

In the present paper, claims 20 and 34 are amended and claims 26-33 and 42-46 are canceled. Claims 1-19 were canceled in a previous paper. Claims 20-25 and 34-41 are now presented for the Examiner's consideration in view of the following remarks.

The Application

The present invention provides an accurate technique and apparatus for finding an insulation fault in an underground conveyance sheath that is causing a locating tone to leak to ground. The invention is designed for use in locating sheath faults on underground cables, in an environment where the cable is commonly covered in ground water. The invention works by using the groundwater or another liquid as a conductor that conducts across a gap between the cable and a probe. Where there is a fault in the sheath causing current leakage from an internal conductor, through a liquid medium to the probe, a voltage differential changes. In that way, the fault is detected.

In the Official Action, the Examiner has rejected claims 27-29, 32 and 41 under 35 U.S.C. § 112, second paragraph, alleging that the claims are indefinite. The Examiner has further rejected claims 20-22, 24, 26, 30, 31, 33, 34, 36-38 and 42 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent Publication No. 2001/0052778 to Smith ("Smith"), and has rejected claims 23, 25, 27-29, 32, 35, 39, 40 and 44-46 under 35 U.S.C. § 103(a) as unpatentable over Smith in view of U.S. Patent No. 5,644,237 to Eslambolchi et al. ("Eslambolchi").

Rejections under 35 U.S.C. § 112, second paragraph

As to the Examiner's rejection of claims 27-29 and 32, those claims have been canceled, making that rejection moot.

The Examiner has rejected claim 41, stating that "it is unclear which device is used for 'initially determining an approximate position for the fault. . . .'" Applicants wish to point out that the current specification teaches:

Using a signal detector of a type well known in the art, a technician locates the conveyance by operating the detector above ground to detect a signal generated by current passing through the cable locating conductor.

Specification at [0003]. Applicants submit that by using a known technique to determine an approximate location of the fault, in combination with additional steps of claim 34, a technician can quickly and efficiently find the exact location of a cable fault.

Applicants therefore submit that claim 41 meets the definiteness requirement of 35 U.S.C. § 112, second paragraph.

Rejections Based on Prior Art

Applicants have amended independent claims 20 and 34 to require that the cable be in contact with the liquid, to require that the probe at least partially surround the cable with a gap between the probe and the cable, and to require that the liquid conducts the current across the gap.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. § 2131

(quoting *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). Applicants submit that independent claims 20 and 34 are novel and non-obvious over Smith for at least the following reasons.

Smith does not disclose current conducted by a “liquid”

Claim 20 and 34 each require a cable at least partially submerged in a “liquid,” and that the current be conducted by the liquid. The Examiner has noted that the term “liquid” includes a gas. Applicants vigorously disagree.

It is well known that most substances, including water, have three phases: gas, liquid and solid. The term “liquid,” as that term is used in the English language, is not a generic term that encompasses more than one of those phases. Instead, it refers to the phase wherein molecules maintain attraction to one another, but are free to move relative to one another. In contrast, molecules in a gas have relative movement but have very little mutual attraction. Gases and liquids are therefore different material phases, and one does not include the other.

Both liquids and gases are *fluids*, meaning that their molecules are capable of relative movement and they tend to assume the shape of their container. That, however, does not make a gas a liquid.

For those reasons, Applicants maintain that Smith does not disclose a cable submerged in a “liquid,” or current conducted by a “liquid,” as required by claims 20 and 34.

Smith does not disclose a liquid “in contact with” the cable

Claims 20 and 34 have been amended to require that the cable be in contact with the liquid. Even if the test gas of Smith were somehow construed to be a liquid, the test gas of Smith

does not contact the cable. Instead, the test gas of Smith is contained within the bladder 150, which is inflated around the cable (Smith at [0038]).

Smith does not disclose a gap between the probe and the cable

Claims 20 and 34 have been amended to require a gap between the probe and the cable. Support for that amendment may be found in the specification at least at paragraph [0026].

Applicants submit that Smith discloses no such gap. Instead, Smith takes measures to insure there are no gaps:

The system 100 performs this detection by holding conductive surfaces against or around the wires 110,120. More specifically, the containment fixture 190 forces the bladder 150 or diaphragm to inflate around the surfaces of the wires 110, 120. If restricted by the containment fixture 190, the bladder 150 and the conductive surfaces associated with the bladder 150 conform and press against and around the wires 110,120 being tested once inflated via the injection of a gas from the gas source 160.

Smith at [0032]. Applicants therefore submit that Smith does not teach or suggest a gap between the probe and the cable, as required by amended claims 20 and 34.

Smith does not disclose a liquid conducting current across the gap

Claims 20 and 34 have been amended to require that the liquid conduct current “across the gap” between the probe and insulation fault. Smith discloses no such arrangement. Instead, Smith teaches two other possibilities: (1) conduction directly through physical contact between the “conductive surfaces” 30, 170 and any insulation defects in the wires 130 (Smith at [0029]), and (2) arcing through the test gas in the bladder (i.e., not between the conductive surface 30 and

the wires) (Smith [0038]). Nowhere does Smith disclose conduction (or arcing) in a gap between the conductive surface and the wires.

Smith does not disclose above-ground detection of a cable locating current

Claims 41 requires an additional step of “initially determining an approximate position of the fault by determining a position along the cable where an above-ground detectability of the cable locating current degrades.” That step, in combination with the steps of the parent claim, provides a powerful method for use in finding a fault on a fiber cable with a cable locating current conductor carrying a cable locating current.

Smith is not concerned with such cables. No cable locating current conductor is taught or suggested, and Smith does not teach or suggest using his disclosed device in conjunction with such a system. .

Conclusion

For each of the reasons set forth above with reference to claims 20 and 34, Applicants submit that those independent claims are novel and non-obvious over Smith and all other art cited in the present case. Applicants further submit that dependent claims 21-25 and 34-41 are patentable at least by reason of their incorporation of the limitations of claims 20 or 34.

Additionally, Applicants submit that claim 41 is patentable for the additional reason set forth above.

Applicants therefore respectfully submit that claims 20-25 and 34-41 are now in condition for allowance, and earnestly request that the Examiner issue a Notice of Allowance.

Should the Examiner have any questions regarding the present case, the Examiner should not hesitate in contacting the undersigned at the number provided below.

Respectfully submitted,

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